Faculty Working Papers

IMPROPER CONFIRMATION RESPONSE: A SUGGESTION

James C. McKeown and Kurt Pany

#428

College of Commerce and Business Administration
University of Illinois at Urbana-Champaign

FACULTY WORKING PAPERS

College of Commerce and Business Administration

University of Illinois at Urbana-Champaign

August 30, 1977

IMPROPER CONFIRMATION RESPONSE: A SUGGESTION

James C. McKeown and Kurt Pany

#428

IMPROPER CONFIRMATION RESPONSE: A SUGGESTION

James C. McKeown and Kurt Pany

University of Illinois at Urbana-Champaign

1977

Abstract

The available research indicates that confirmations used to validate accounts receivable balances are not completely reliable. Specifically, the research reveals that confirmations sent with erroneous balances to debtors are often returned with no exceptions noted. The authors propose an adjustment factor which allows auditors to adjust overall sampling results to properly reflect these erroneous replies.

Improper Confirmation Response: A Suggestion

In 1939 largely as a result of the McKesson and Robbins case, the direct confirmation of accounts receivable became a generally accepted auditing procedure. Today confirmations are a primary type of evidence used by auditors in support of the amount owed by debtors. However, two basic sources of error may affect the credibility of confirmations. First, sampling errors may result from estimating population values on the basis of a sample. The sample mean and variance estimates may thus deviate from the "true" population parameters. This type of error can be evaluated through the use of statistical inference techniques, and controlled by selection of precision and reliability measures.

The second source of error is non-sampling error, that is, errors from sources other than sampling. Although a variety of forms of non-sampling errors may occur, major sources of potential error exist when a debtor:

1. does not reply to a confirmation request,
2. states that the balance on the confirmation is not correct when in fact it is correct,
3. states that the balance on the confirmation is correct when in fact it is not correct.

The problem of the non-reply is often alleviated through the use of alternate procedures such as the examination of sales orders, shipping documents, subsequent cash collections, etc.; these alternate forms of evidence give the auditor some level of assurance as to the existence and amount of the receivable. Errors caused by the second source should be detected through reconcilation procedures which resolve differences between client and debtor balances reported on confirmation requests. Generally items in transit, either goods or cash, account for a high proportion of such differences.

However, the third source of error, the confirmation which the debtor returns with no exception noted when the balance reported is, in fact,

incorrect, presents especially bothersome problems. The question arises as to the competency and therefore the sufficiency of the debtor's confirmation as evidence of the amount of the receivable and perhaps even its existence. If the debtor has done a conscientious job of comparing his balance to the client's balance in the confirmation, it would seem that the former's statement that the amount is correct would provide sufficient support for the existence of the receivable. But, how conscientiously do debtors examine their reciprocal payable balances when a confirmation request is received? Do they report any differences found?

Studies by Davis, Neter and Palmer (1967), Sauls (1970,1972) and Warren (1974a, b, c, 1975a, b) all have indicated that when confirmations are sent out with errors, many of them are returned by debtors with no exceptions noted. Table 1 summarizes "detection" rates for each of the studies.[1] The conclusion one must arrive at upon analysis of Table 1 is that some debtors either do not conscientiously examine receivable balances when a confirmation request is received, or if they do, they do not report differences to the auditor.

The purpose of this paper is to propose an adjustment factor, ϕ, which corrects for the confirmations which have not been examined before the confirmation is returned to the auditor. The paper first, through the use of an example, outlines the problem of improper response[2] and proposes an adjustment factor. Second, a formula for revising estimated sample size to

---

[1] See Warren (1975a) for a more detailed summary of each of these studies.

[2] An improper response is one made by the debtor without examination of the accuracy of the confirmed balance. At this point we assume that an improper response only occurs in the case of no exception returns, i.e. where the debtor indicates complete agreement with the client balance (the case of erroneous exceptions taken by the debtor is considered below). This assumption is based on the reasoning that a debtor who returns a confirmation without analyzing his balance will probably assume the client is correct and report no exception.

TABLE 1

Detection Rates for Positive Confirmations

Study	Detection Rate*	Corresponding ϕ
Davis, Neter, Palmer	64.5%	35.5%
Sauls--Bank	100.0	0.0
Credit Union	83.3	16.7
Hubbard, Bullington	54.3	45.7
Warren--Loans	32.1	67.9
Share Accounts	26.2	73.8

$$\text{*Detection Rate} = \frac{\text{Number of incorrect balances reported}}{\text{Number of respondents to misstated confirmations}}$$

reflect subsequent use of the factor is suggested. The model is then generalized to include the problems of non-replies and erroneous exceptions taken by the debtor. General guidelines for estimation of ϕ and conclusions follow.

ADJUSTMENT OF CONFIRMATION RESULTS

Assume a population of 1,000 receivable accounts. A sample of 90 accounts has been selected and the mean per unit estimation technique outlined in the AICPA's Field Manual For Statistical Sampling (1974) is to be used. To simplify the procedure, assume that replies have been received from all 90 debtors (this assumption is relaxed below). Table 2 presents the sampling results.

Because variance figures for both exception and nonexception returns are given, the overall variance figure in Table 2, \$9,452.81, may be calculated either by aggregating all of the data (not presented) and using the standard formula:

$$(1) \quad S_x^2 = \frac{n\,(x_i - \bar{x})^2}{n - 1}$$

where: S_x^2 = Estimate of the variance of items in the population

x_i = Individual account balances

$\bar{x}$ = Mean of individual account balances

or by combining the exception and nonexception variances through the use of the formula:

$$(2) \quad S_x^2 = \frac{\sum_{i=1}^{n_1}(x_i - \bar{x}_1)^2 + \sum_{i=n_1+1}^{n}(x_i - \bar{x}_2)^2 + n_1\,(\bar{x}_1 - \bar{x})^2 + n_2\,(\bar{x}_2 - \bar{x}}{n_1 + n_2 - 1}$$

where: $\bar{x}_1$ = Mean of individual account balances in group 1 (exception returns in this case)

$\bar{x}_2$ = Mean of individual account balances in group 2 (no exception returns in this case)

n_1 = Sample size of group 1 (exceptions)

n_2 = Sample size of group 2 (no exceptions)

Using the results of Table 2 we find that the expected value of the receivables is \$301,670 (\$301.67 x 1,000 items) and we may calculate 95% confidence intervals for the population as:

$$(3)^{3} \quad A = \frac{R \times N \times S_x}{\sqrt{n}} = \frac{1.96 \times 1{,}000 \times 97.23}{\sqrt{90}} = \$20{,}088$$

where: A = Precision
R = Reliability factor
N = Population size
S_x = Estimate of standard deviation of items in the population
n = Sample size

Thus, using the mean per unit estimation method sampling plan suggested by the AICPA we obtain a confidence interval for receivables of \$281,582-\$321,758.

The calculated interval is based on the premise that all of the confirmations should be considered equally credible. But, as discussed above, we have reason to believe that some of the confirmations returned with no exception noted may not have received the proper attention of the debtor.

If it is true that some of the confirmations have not been adequately considered by the debtor, then the related accounts can not be considered as confirmed. Ideally the auditor would determine which of the confirmations without exception had not been adequately considered, eliminate them from

[3]This formula and the other formulas in this paper ignore any possible finite correction factor.

TABLE 2

Confirmation Results: ϕ =0

Reply	Number	Mean	Variance	Standard Deviation
Exception	30	$285*	$12,100*	$110
No Exception	60	310	8,100	90
TOTAL	90	$301.67	$ 9,452.81	$ 97.23

*These figures reflect the mean and variance calculated after the exceptions were adjusted to correct balances. Before correction these accounts had a mean of $330 and a variance of $10,000.

the sample, and calculate statistics based on the accounts for which credible responses had been received. But in general the auditor will not be able to identify these individual improper responses.

Ignoring the problem of improper responses may be hazardous. For example, assume the admittedly unrealistic case in which all of the client's receivable accounts are misstated and that of the 90 confirmations sent above, the only ones with proper debtor responses are the 30 noted with exceptions; in other words, assume that the 60 "no exception" replies were improper. In that case the auditor would certainly wish to consider the improper responses in further detail. Possible solutions would be to attempt to re-confirm accounts in some more meaningful manner or to adopt alternate procedures to determine the proper account balances. But at a minimum it would not be proper to consider the confirmations as "evidence" in support of receivables if the auditor knew them to be in error. Therefore, the auditor might wish to calculate his sample results based on the 30 confirmations in which he had confidence. Using formula 3 he would estimate a mean of $285,000 with a confidence interval of $245,637 - $324,363. Thus, in actuality, the auditor in this example would not have come close to achieving the precision he had at first believed, and he would have a considerably different estimate of the population mean.

The original example and this example have considered two extremely unlikely cases--perfect credibility and zero credibility in the no exception replies. The empirical literature discussed above points out that the actual situation usually is between these two extremes. Unfortunately, the current AICPA guidelines are based solely on the first unrealistic situation--perfect credibility.

To summarize the discussion up to this point, we have determined that the confirmations which came back with exceptions have been adequately

reconciled and are considered credible by the auditor. But, of the replies with no exceptions noted, the auditor has reason to believe that some of them have not been adequately considered by the debtor. The no exception replies arise either when the debtor, based on his analysis, agrees that the amount is correct, or when the debtor has not carefully analyzed his account and has simply signed the confirmation. In this latter case, the account may or may not be correct; no real evidence has been gathered to support it. A solution to the problem of improper response on the no exception confirmations lies in estimating the proportion of confirmations which belong to each of the these groups.

We may classify the 90 returned confirmations in our example into four groups:

	debtor analyzes carefully	debtor does not analyze, reports no exception
Client balance correct	N_1	N_3
Client balance incorrect	N_2	N_4

The 60 confirmations which have been returned without exception are in one of three groups:

(1) Accounts which are error free and have been carefully analyzed by the debtor (N_1).

(3) Accounts which are error free but have not been carefully analyzed by the debtor (N_3).

(4) Accounts which are not error free and have not been analyzed by the debtor (N_4).

In the latter two cases, no evidence has been gathered to support or reject the account balances. Ideally the auditor would determine which confirmations fit in each group and either perform additional audit procedures on

groups 3 and 4 or at a minimum only incorporate group 1 accounts into his analysis. In practice, he is, of course, unable to determine which of the 60 accounts fit into each group.

Most of the evidence gathered to date concerning improper confirmation responses (reported in Table 1) is based only on confirmations of incorrect client balances--Groups 2 and 4 in our layout. Thus if an auditor had access to a study which reported that in a situation similar to his audit environment 2/9 of the confirmations returned related to incorrect client balances but reported no exception, he might estimate that $\frac{N_4}{N_2+N_4}$ would be approximately 2/9. His next problem would be to estimate the proportion of replies in Groups 1 and 3. A straightforward method of making this estimate would be to assume that the confirmations in Group 4 were the result of the debtor returning the confirmation with no analysis. This would mean that the "decision" not to analyze would be independent of the validity of the client balance, i.e. since the decision not to analyze is made before the analysis, the probability of the client returning a confirmation without analysis must be the same whether the client balance is correct or not.[4] Under these assumptions

$\frac{N_3}{N_1+N_3} = \frac{N_4}{N_2+N_4} = 2/9 = \phi$ (the adjustment factor). He would also expect the the overall proportion of unanalyzed responses would be 2/9.

Applying this to our example, we estimate that 20 of the 90 returns -- all reporting no exception, were not analyzed by the debtor. We are assuming that all 3

---

[4] Although different assumptions are possible due to factors such as size of account, direction of misstatement, and magnitude of misstatement, insufficient research exists to evaluate the overall reasonableness of this assumption. However, the various studies referred to do not make the assumption untenable. To the extent that large accounts, large misstatements, and misstatements unfavorable to the debtor would seem on an a priori basis to have higher response rates and greater likelihood of investigation than other errors, the adjustment proposed will generally be "conservative" in the sense of understating the account receivable balance.

of the exception returns (N_2) were analyzed by the debtor. We can also estimate that approximately 9 of the unanalyzed confirmations related to accounts which have errors in the client balance:

$$\frac{N_4}{30+N_4} = \frac{2}{9}$$

$$N_4 \simeq 9$$

Similarly

$$N_2 \simeq 11$$

Thus, the auditor estimates that the breakdown of the 60 confirmations returned without exception is:

Group 1	40
Group 3	11
Group 4	9
Total	60

The next step is to delete the group 3 and 4 replies. The group 4 confirmations have been erroneously included in the no exception results and are reflected in the mean and variance calculations. If the mean and variance of incorrect accounts differ from those of accounts which are properly stated, the incorrect accounts bias the "no exception" statistics.

To calculate the adjusted mean, subtract the number of group 4 accounts at the average book value of the known erroneous accounts (per footnote to Table 2, $330):

Mean per Table 2	60 at $310	= $18,600
less	9 at 330	= 2,970
Average	51 at $306.47	= $15,630

But, because we believe that only 40 of these have been considered, 40 at \$306.47 are entered in Table 3.

An adjustment to the variance can also be made. As reported in Table 2, the original variance in the confirmations returned with exception is \$10,000 before correction. Formula 4 gives the relationship between variance and the sum of squares needed for future calculations:

$$(4)\quad (n-1)\ S_x^2 = SS$$

where: SS = Sum of squares or $\sum_{i=1}^{n} (x_i - \bar{x})^2$

Using formula 4 the sum of squares for the exception returns is \$290,000 ((30 - 1) x 10,000). The average sum of squares for each exception account is therefore \$9,666.67 (290,000/30).

Using a variation of formula 3:

$$(5)\quad SS = SS_1 + SS_2 + n_1(\bar{x}_1 - \bar{x})^2 + n_2(\bar{x}_2 - \bar{x})^2$$

where, in this case,

SS = sum of squares related to the 60 accounts returned without exception by the debtors (1800 x (60 - 1)).

SS_1 = sum of squares related to the estimated 51 accounts in groups 1 and 3, (40 + 11) which were returned by debtors without exception.

SS_2 = sum of squares related to the estimated nine accounts in group 4 which were returned by debtors without exceptions (9 x 9,667).

n_1 = estimated accounts in groups 1 and 3 which have been returned by debtors without exceptions (40 + 11 = 51).

n_2 = estimated accounts in group 4 which have been returned without exceptions (9).

$\bar{x}_1$ = mean of groups 1 and 3 (above).

$\bar{x}_2$ = mean of group 4 (Table 2 footnote).

$\bar{x}$ = mean of no exception replies (Table 2).

TABLE 3

Confirmation Results: $\phi = 2/9$

Reply	Number	Mean	Variance	Standard Deviation
Exception	30	$285	$12,100	$110
No Exception	40	306.47	7,776	87.94
TOTAL	70	$297.27	$ 9,595	$ 97.96

We may calculate the sum of squares associated with SS_1--in this case the 51 confirmations which belong to groups 1 and 3:

$$477{,}900 = SS_1 + 87{,}000 + 51(306.47-310)^2 + 9(330-310)^2$$

$$SS_1 = 386{,}664$$

SS_1 relates to 51 "no exception" confirmations. They have an average per unit sum of squares of 7,581.65 (386,664/51). Using this for the 40 remaining confirmations, formula 4 gives an estimate of the variance of $7,77[illegible]. This variance figure is incorporated in Table 3; formula 2 is then used to aggregate the data. The new confidence interval becomes $274,321 - $320,219 with a mean of $297,270. Thus the estimate of the population mean has changed by more than $4,000 in this manufactured example. The proposed adjustment gives the auditor an estimate of the mean and confidence interval which eliminates the percentage of confirmations which the auditor believes have not received adequate consideration by debtors.

CALCULATION OF DESIRED SAMPLE SIZE

The auditor using the proposed adjustment factor will wish to increase the planned sample size to consider those confirmations which will later be deleted. The basic estimation sampling formula for calculating desired sample size without replacement is:

$$(6) \quad n = \frac{S_{xe}^2 \times U_r^2}{A^2}$$

where: S_{xe} = The estimated standard deviation of the population before sampling (assume it to be 95 in this example).

U_r = Reliability factor

A = Precision

Using the estimated variance we obtain a desired sample size of:

$$\frac{95^2\ (1.96)^2}{20^2} = 87 \approx 90$$

To determine the additional sample necessary to meet his objectives, the auditor must estimate the expected number of replies which will be returned without meaningful examination and use the following formula to adjust:

$$(7) \quad n^* = \frac{n}{1 - \phi} = \frac{S_{xe}^{\ 2} \times U_r^{\ 2}}{A^2 (1 - \phi)}$$

where: ϕ = the adjustment factor (expected percentage of accounts not "meaningfully" confirmed).

n^* = the adjusted sample size

EXTENSIONS OF THE MODEL

To this point all exceptions reported by the debtor are assumed to have been carefully analyzed reports of incorrect client balances and replies are assumed to have been received for all confirmations sent. These assumptions may be relaxed.

In the case of the debtor who takes exceptions erroneously (i.e., the account is in reality properly stated or is improperly stated but the confirmation balance is also incorrect), the question becomes one of whether the auditor should consider the account to be "meaningfully" confirmed or whether it should be counted as one of those accounts deleted through the adjustment factor. When the auditor determines that the debtor has made an error in his response, evidence has been gathered relating to the account. Therefore, the account may be considered with the no exception or exception confirmations as appropriate, but the account should be counted as not meaningfully confirmed. Thus if, in our example, two accounts were reported as

exceptions, but were actually correctly stated, we would only delete 9 no exception accounts from the 58 reported no exceptions.

Nonreplies present another problem. The first question arises as to whether the adjustment factor should be based on the total confirmations sent or on the total confirmations returned to the auditor. This is an empirically testable question as research is needed to determine which of these two figures has a more consistent relationship with the percentage of improper responses. At this point we arbitrarily select the number of confirmations returned to provide the base.

The second concern with nonreplies is how to handle them in the detailed analysis. At least four possibilities exist. First, the auditor may adjust the replies for confirmations returned without analysis by the debtor as previously illustrated. He can then perform his alternative procedures on accounts for which no replies were received. The groups can then be combined through use of formula 2.

A second approach is to incorporate the data as in the first approach, but to also incorporate the errors found in the non-reply accounts into the estimates of mean and variance of the erroneous accounts. This will incorporate additional information into the estimation of misstated accounts. To the extent that the auditor has confidence in his alternate procedures, this may be desirable.

Third, the auditor may use the data in the form suggested in the second approach above and also incorporate it into his estimates of the percentage of accounts correct and in error for use in estimation of the breakdown between Groups 3 and 4 confirmations.

Finally, as discussed by Warren (1975b), the auditor may decide to ignore the nonreplies. This approach relies on the assumption that nonreplies have the same characteristics as the population as a whole. Given the possibility of performing alternate procedures on the specific accounts in question, this assumption may be quite risky. Until a significant amount of empirical research exists in support of this assumption, this approach is not advised by the authors.

The second approach, which allows the auditor to have a larger sample of confirmations on which to base error estimates, seems preferable. Because alternate procedures may not be as effective as confirmations in discovering certain errors (e.g., cancellations, amounts in dispute), it seems unwise to incorporate the results into the calculation of the percentage of confirmations returned with exceptions as suggested in the third approach.

It may be noted that approaches 1, 2, and 3 allow the auditor to decrease the required sample size to

$$(8) \quad n^{**} = \frac{n}{1 - \phi(1-NR)} \quad \text{or} \quad \frac{n^{*}(1-\phi)}{1 - \phi(1-NR)}$$

where: n^{**} = the necessary sample size under approaches 1, 2, and 3.

NR = the expected percentage of nonreplies

n = the desired effective sample size

n^{*} = the required sample size if all debtors replied

The formula under approach 4 becomes:

$$(9) \quad n^{**} = \frac{n^{*}}{1 - NR}$$

The choice between the approaches discussed above rests in large part upon the auditor's judgment concerning two questions: (1) How does the

distribution of nonreply accounts compare to the distribution of accounts for which confirmations are returned? and (2) How effective are the alternative procedures? Note, however, that these same questions must be answered in any confirmation situation where the response rate is less than 100%. Thus, while the proposed procedure does not solve the problem of nonreplies, the procedure is not complicated by nonreplies any more than a standard confirmation analysis.

ESTIMATING ϕ

Estimating the percentage of confirmations which will be returned without analysis by the debtor is admittedly no small task. Table 1 shows the percentage of errors discovered by debtors when positive confirmations were sent out with erroneous data included. However, the results presented may not be relevant to most audits since none of them relate to corporations where receivables have been confirmed with predominantly commercial corporate debtors. Also, misstatements have rarely been in excess of ten percent per confirmation.

It is obvious that no meaningful "overall" rate can be derived from the data, and that the auditor will have to consider the type of client involved and use considerable professional judgment in arriving at the adjustment factor. Although judgment is needed in calculating ϕ, we again note that the currently used system does not avoid this use of judgment--it simply sets the adjustment factor equal to zero arbitrarily, a most unconservative assumption.

Another procedure suggested to the auditor to support his judgmental value of ϕ is "sensitivity analysis." Table 4 illustrates this procedure.

TABLE 4

Means and Confidence Intervals Under Various Estimates of "ϕ"

	ϕ = 0	1/9	2/9	4/9	6/9
Mean	$301,670	$299,730	$297,270	$289,670	$285,000
Confidence Interval - 95%					
Low	281,582	278,353	274,321	262,180	245,637
High	321,758	321,112	320,219	317,153	324,363

In this way the auditor can estimate the effect of possible errors in his estimate of ϕ. For example, assume an auditor estimated that the probable ϕ for a particular set of confirmations was eight percent. If he recomputed his test using a ϕ of forty percent and found that he could still accept the client balance, he would probably feel quite comfortable. If he found that a ϕ of ten percent would require rejection of the client balance, he might choose to proceed conservatively as if the rejection had occurred. Thus the auditor can not only adjust for his estimates of ϕ, he can also determine how critical that estimate is.

CONCLUSION

The adjustment procedure proposed allows the auditor to incorporate his judgment of the reliability of confirmations. By varying the factor the auditor may both determine its effect on the original sample size and, when the confirmations have been returned, he may vary the factor to test the effect on the resulting mean and precision limits. The factor may easily be incorporated into the auditor's sampling plan. The example included here used mean value estimation sampling. The adjustment procedure may also be applied to other sampling plans such as ratio, difference, and various stratified plans. If negative confirmations are used, the factor would be applied to the nonreplies, but the remainder of the procedure would be the same.[5]

As Sauls (1970) has suggested, "it appears imperative that a solution be evolved to cope with the improper response." Although the auditor,

[5] Sauls (1970) reports that ϕ would be larger for negative confirmations.

recognizing the possibility of legal liability, does not want to reduce t credibility of the confirmation process, he should be aware that the existing empirical research has already reduced the credibility. It remains to take actions, such as the proposed adjustment, to restore that credibility.

REFERENCES

American Institute of Certified Public Accountants, Field Manual for Statistical Sampling, Volume 6 of an Auditors Approach to Statistical Sampling, 1974.

Davis, Gordon, B., John Neter and Roger R. Palmer, "An Experimental Study of Audit Confirmations," The Journal of Accountancy (June 1967), pp. 36-44.

Hubbard, Thomas D., and Jerry B. Bullington, "Positive and Negative Confirmation Requests--A Test," The Journal of Accountancy (March 1972), pp. 48-56.

Sauls, Eugene H., "An Experiment on Nonsampling Errors," Empirical Research in Accounting: Selected Studies, 1970, Supplement to the Journal of Accounting Research, pp. 157-171.

______, "Nonsampling Errors in Accounts Receivable Confirmation," The Accounting Review (January 1972), pp. 109-115.

Warren, Carl S., "Non-Commercial Organization Confirmation Reliability in Audits--A Credit Union as a Case," The CPA Journal (February 1974), pp. 67-69.

______, "Confirmation Informativeness," Journal of Accounting Research (Spring 1974), pp. 158-177.

______, "Confirmation Reliability: Two Studies Out of Tree Recommend Positive Confirmations for the Best Audit Results," CA Magazine (May 1974), pp. 26-32.

______, "Confirmation Reliability--The Evidence," The Journal of Accountancy (February 1975) pp. 85-89.

______, "Forget the Silent Minority, Audit Where Audit is Due," CA Magazine (February 1975) pp. 26-30.